

New Information on the Distribution of Marine Mollusca on the Coast of British Columbia

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THROUGH THE LAST EIGHT or ten years intensive investigation of the marine mollusca of the coast of British Columbia has led to the modification of the known range of many species. The investigations have not been evenly distributed. Regions collected in most detail have been the north coast of Graham Island and adjacent waters by Peter Henson of Masset, B.C., and the Strait of Georgia, Johnston Strait, Queen Charlotte Strait and the south west coast of Vancouver Island by the present author. Several other collectors have worked primarily in the Strait of Georgia, and Dr. D. B. Quayle and his associates have explored more widely. The majority of their collections, however, have not yet been worked up. Rae Baxter of Cordova, Alaska, made a canoe traverse of the coast collecting in the intertidal in which certain local range extensions were obtained.

I am indebted to all of these for permission to include their findings. I wish especially to acknowledge the generosity, assistance and companionship of Peter Henson whose enthusiasm has led to greatly increased knowledge of the mollusc fauna of the Queen Charlotte Islands area. He has given me permission to record certain major extensions of range represented by specimens in his collection but missing from mine. James McLean, of the Department of Biology, Stanford University and Dr. R. M. Rosenblatt of Scripps Institute accompanied me on some expeditions. Several malacologists have given advice and assistance on critical determinations. For this I am particularly grateful to Dr. Myra Keen, Dr. Geo. Hertlein, Dr. A. H. Rehder, Mr. Allyn Smith, Mr. James McLean and Mr. Spencer Thorpe.

My own collecting has involved some 200 stations on the B. C. coast of which 40 were intertidal, 115 in the subtidal down to 50 fathoms, 30 between 50 fathoms and 95 fathoms and 17 from 100 to 200 fathoms. A very limited amount of Scuba diving has been involved in the immediate subtidal area but for the most part dredges of several types have been used.

The purpose of this paper is to record major range extensions that arise from the collecting so far undertaken. Certain groups are not included, because critical comparison with type material has not yet been made. Notably these include the Turrid genera *Oenopota* and *Mangelia* and the Pyramidellid genera *Turbonilla* and *Odostomia*. These will be reported upon later.

It is pertinent to note that 7 of the extensions of range reported here are southward and 29 northward. Ten of the latter now exhibit an apparent discontinuity of several hundred miles. Further collecting along the coasts of Washington and Oregon is needed before it can be concluded that any of these species are divided into northern and southern centers of occurrence separated by an uninhabited area.

Lamellibranchia

Nuculana austini (OLDROYD, 1935) Previously known from the west coast of Vancouver Island, now extended north to Masset Inlet, Graham Island, Q. C. I.

Nuculana pernula (MÜLLER, 1779) Several unusually large *Nuculana* from Chatham Sound, Q. C. I. at 30-60 fathoms are closest to this species though differing slightly from specimens originating in Arctic Canada. Not previously reported in the Pacific south of the Arctic Basin.

Yoldia martyria DALL, 1897. Although the published distribution of this species is from Kasa-an Bay, Alaska, to the Gulf of California. I have been unable to find specimens from the area north of the Olympic Peninsula, Washington, except for one in the U. S. N. M. This one, from Kasa-an Bay, is in poor condition and not identifiable with certainty. The species is common in 100+ fathoms on soft mud bottoms off the northern end of Texada Island, B. C., and I have a single specimen from Barkley Sound, Vancouver Island.

Adula californiensis (PHILIPPI, 1847). The northernmost record is from Vancouver Island, B. C. (La Rocque). Henson has found a colony near Yakan Point on the north

coast of Graham Island, Q. C. I., from which I have taken specimens.

Musculus taylori (DALL, 1897) Previously known only from Victoria, B. C. I have taken specimens from Hot-spring Island, Q. C. I., where it was nestling in coralline algae.

Astarte willetti DALL, 1917. Reported only from the type locality, Forrester Island, Alaska. I have taken specimens at three localities south to Goose Island Banks in Hecate Strait and Barkley Sound, Vancouver Island.

Lasaea cistula KEEN, 1938. Has been reported from Ensenada, Mexico, to Punta Arena, California. I have specimens from Cape Sutil and from Roller Bay, Hope Island, both at the northern tip of Vancouver Island. I am grateful to Dr. Myra Keen for verifying the identification of these specimens.

Tellina bodegensis HINDS, 1844. A specimen from La Pas Bay, west coast of Graham Island, Q. C. I., (Henson coll.) extends the range northward from Esperanza Inlet, Vancouver Island, the previously known limit.

Protothaca tenerrima (CARPENTER, 1856). The locality records are extended northward to Esperanza Inlet, west coast of Vancouver Island. It was previously known from a northern limit at Victoria and Puget Sound.

Xylophaga washingtona BARTSCH, 1921. Abundant in wood detritus to 60± fathoms at least as far north as Esperanza Inlet, Vancouver Island.

Penitella conradi (VALENCIENNES, 1846). Not previously recorded north of the San Francisco area, California. A group of 40± *Haliotis kamtschatkana* collected at Esperanza Inlet by D. B. Quayle and me bore this species in the heavier parts of the shell. Twenty-two specimens of varied sizes were taken. Examinations of several hundred shells of this abalone from Tofino Inlet, Barkley Sound, Victoria. Strait of Georgia, Port Hardy and the Queen Charlotte Islands has not turned up a single infected individual. The region from Esperanza Inlet north to Cape Cook, Vancouver Island, has yielded specimens of two species of algae and another mollusc (*Bornia*) not known elsewhere on the coast north of central California. It is tempting to suggest that this region occasionally experiences invasion of an offshore water mass originating on the California coast and that this bears with it the larvae of marine organisms and spores of algae from the area of origin. There is evidence, however, that this species is established in the Esperanza region as several age classes are represented.

Bornia cf. *B. retifera* DALL, 1899. Abundant in the entrance of a small lagoon in Esperanza Inlet in association

with an enteropneust. Not previously known north of central California.

Gastropoda

Lepeta caeca (MÜLLER, 1776). This species was recorded by MacGinitie (1959) south in the Bering Sea to the Aleutian Islands. The known range can now be extended south to Vancouver Island on the basis of 4 specimens dredged off Cape James, Hope Island, in 20-50 fathoms, and another taken off Halkett Point, Gambier Island, B.C.

Calliostoma variegatum CARPENTER, 1864. I have taken specimens north to Queen Charlotte Strait at depths between 20 and 90 fathoms. It was previously known north to Puget Sound.

Calliostoma platinum DALL, 1889. This species has been previously recorded from the Farallon Islands to San Diego, California. On August 10, 1961, Henson took a living specimen (height 25.5 mm) in a dredge operating between 99 and 101 fathoms off Wiah Point, Queen Charlotte Islands. Since then a second specimen has been obtained.

Homalopoma engbergi (WILLET, 1929). The only locality of record is Olga, Washington. I have specimens from Skidegate, Q. C. I., and from Port Dick, Alaska. The latter were collected by Rae Baxter.

Homalopoma lacunatum (CARPENTER, 1864). This species was described from Neah Bay, Washington, as a species of *Gibbula*. The present assignment follows the suggestion of James McLean. It has been taken by me at Skidegate, Q. C. I., B. C.

Opalia chacei STRONG, 1937. Specimens from Queen Charlotte Strait extend the known range north from the previous northern limit at central Oregon. The status of this species as distinct from *O. wroblewskii* remains to be determined. Specimens apparently referable to both these are found together in the waters off northern and central British Columbia.

Epitonium greenlandicum (PERRY, 1811). Known south to Wrangell, Alaska, specimens have been taken by Henson and myself off the north end of Graham Island, Q.C.I.

Epitonium catalinae DALL, 1908. This species was taken by Willett at Forrester Island, Alaska, but there have been no other records of occurrence north of California. I took one specimen on La Perouse Bank off Barkley Sound, V. I., at a depth of 38-40 fathoms.

Epitonium acrostephanus DALL, 1908. The same dredge haul that produced the *E. catalinae* contained a living adult specimen of *E. acrostephanus*. OLDROYD (1924) records the species from the California coast only but

BURGH (1944) gives Puget Sound as a locality without a reference.

Crepidula adunca SOWERBY, 1825. Previously reported north as far as southern Vancouver Island (Departure Bay). I have specimens from Hotspring Island, Q. C. I., B. C., and Henson has beach specimens from the north coast of Graham Island, Q. C. I. It was very common on *Calliostoma ligatum* dredged in 7 fathoms on Nahwitti Bar, at the northern extremity of Vancouver Island. WHITEAVES (1880) records specimens from an unknown locality in the Queen Charlotte Islands but the record has been questionable.

Hipponix antiquatus LINNAEUS, 1767. Specimens taken on Graham Island, Q. C. I., first by Henson and later by myself extend the range northward from Vancouver Island. This is probably the same species recorded by WHITEAVES (1880) as *H. cranioides* CARPENTER from an unknown locality in the Queen Charlotte Islands.

Lacuna variegata CARPENTER, 1864. Previously known north from California to Neah Bay, Washington, now known from Port Alexander, Nigei Island, B. C., and from Dall Island (U. S. N. M.) and Drier Bay, (McLean) Alaska.

Trichotropis bicarinata SOWERBY, 1825. This boreal species has been taken previously south to Icy Cape, Alaska. The Henson collection contains a specimen taken at 57 fathoms off Cape Edensaw, Queen Charlotte Islands.

Trichotropis borealis BRODERIP & SOWERBY, 1829. The southern limit of the known range can now be extended south to Nitnat Lake on the West Coast of Vancouver Island on the basis of a specimen in my collection. Henson has taken a living specimen in a crab pot 4-5 miles off Tow Hill, Q. C. I., B. C.

Bittium challisae BARTSCH, 1917. This is the common *Bittium* in water 7 to 60 fathoms from Georgia Strait north to the northern end of the Queen Charlotte Islands. Previously known only from Puget Sound. The use of this name is subject to revision when the complicated synonymy of the genus is reviewed.

Ocenebra atropurpurea CARPENTER, 1919. Described from Puget Sound. Specimens were taken by J. McLean and myself at Roller Bay on Hope Island. This places the species in the waters of Queen Charlotte Strait.

Ocenebra sclera (DALL, 1919). This species has been taken at several localities north to the north coast of Graham Island, Q.C.I. Previously known north to the Puget Sound area.

Amphissa versicolor DALL, 1871. This species is known to occupy a range from the Oregon coast to Cerros Island,

Lower California, except for DAWSON'S (1880) report from Queen Charlotte Islands. I have taken specimens from several localities around Vancouver Island and at Wiah Point, Graham Island, Q.C.I., thus confirming the earlier record.

Nassarius fossatus (GOULD, 1849). The presently known northern limit is Vancouver Island. Henson and I have both taken specimens near Yakan Point, and at Wiah Point, Graham Island, Q.C.I.

Neptunea ithia (DALL, 1891). This species has been known only from the coast of California south of Monterey Bay. I have three specimens from La Perouse Bank off the mouth of Barkley Sound, Vancouver Island, B. C. They were taken at depths of 40-60 fathoms.

Fusinus harfordii (STEARNS, 1871). This species was described and known only from Mendocino County, California. In 1963 a party of us, including R. Rosenblatt of Scripps Institute, J. McLean of Stanford, G. I. McT. Cowan and myself obtained living specimens by Scuba diving, and dead specimens by dredging at Bull Harbour on Hope Island, B. C. In addition McLean took specimens on a boulder beach in the *Phyllospadix* community at Boulder Bay, Hope Island.

"*Ophioidermella grippi*" (DALL, 1919). A single specimen identified as this species was dredged in 15 fathoms in Toquart Bay, Barkley Sound, Vancouver Island, B. C., and two others from the Strait of Georgia in depths of 23 and 120 fathoms. The northernmost previous occurrence is in the San Diego area of southern California.

Ophioidermella fancherae (DALL, 1903). A small species of *Ophioidermella* presently referred to this species has been taken at various points along the British Columbia coast north as far as Wiah Point, Graham Island, Q.C.I. It was first taken by Henson in 1960 and by myself in 1961.

Cylichna nucleola (REEVE, 1855). This has been known as a circumboreal species not occurring south of the Bering Strait. I dredged 2 specimens that appear to represent this species off Sarita, in Barkley Sound, Vancouver Island, B. C.

Diaphana cf. D. brunnea DALL, 1919. This species has been known only from Kodiak Island, Alaska. I have specimens from Tofino Inlet, on the west coast of Vancouver Island and from Plumper Sound in Georgia Strait.

Polyplacophora

Chaetopleura gemma DALL, 1879. Two specimens of this species from Pachena Bay, Vancouver Island, B. C., and three more from Hope Island on Queen Charlotte Strait, B. C., extend the known range northward from the Monterey area of California.

Mopalia phormix BERRY, 1919. This species has been known from subtidal waters of the Monterey area of California. I have taken a single specimen in 50 fathoms off Hood Point, Bowen Island, B. C., and 3 from Sidney Channel, Georgia Strait, B. C., at $40 \pm$ fathoms.

Hanleya hanleyi (BEAN, 1844). The genus *Hanleya* has been known from the Pacific on the basis of a specimen from Plover Bay, Siberia (THIELE, 1909) and another from Monterey, California, that served as the type of

Hanleya spicata BERRY. The dredging of some 40 specimens in the waters of Queen Charlotte Sound, B. C., off Cape James, Hope Island, is therefore, of considerable interest. It was taken in 20-50 fathoms on a gravel bottom.

Ischnochiton cf. *I. golischi* BERRY, 1919. A single specimen dredged on mud bottom in 119 fathoms on October 2, 1963, in Georgia Strait 2 miles off Edith Point, Mayne Island, provides the only specimen record north of Monterey Bay. I am grateful to Spencer Thorpe for his identification of this specimen.

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